March 18, 1996
GSI Job No. G-1584

Mr. James Gonzales
U.S. Air Force Center for Environmental Excellence/EST
8001 Arnold Street
Brooks AFB, Texas 78235-5357

Re: Second Groundwater Sampling Program, Natural Attenuation Demonstration Study, SWMU 66 Site, Keesler AFB, Biloxi, Mississippi.

Dear Mr. Gonzales:

In accordance with your request, Groundwater Services, Inc. (GSI) is currently conducting a Demonstration of Natural Attenuation Project at the SWMU 66 site at Keesler Air Force Base in Biloxi, Mississippi (see Figure 1). On November 21, 1995, GSI submitted to AFCEE a Treatability Study/Corrective Measure Study (TS/CMS) for the SWMU 66 site. Details of previous investigations and site background can be found in that study. The current report presents the results of the second groundwater sampling program conducted at the site in order to confirm the conclusions reached in the TS/CMS report. The sampling and testing program has been conducted in general accordance with the "Technical Protocol for Implementing the Intrinsic Remediation with Long-Term Monitoring Option for Natural Attenuation of Dissolved-Phase Fuel Contamination in Groundwater" (Wiedemeier *et al.*, 1994). Details of the sampling and testing procedures can be found in Appendix A, results of the investigation are discussed below.

SITE HYDROGEOLOGY

The Coastal Deposit sands underlying the SWMU 66 site from the ground surface to a depth of more than 26 feet represent the uppermost water-bearing unit beneath this site. A total of 5 monitoring wells (including a hand augered temporary replacement for well MW9-5) and 15 cone penetrometer (CPT) piezometers were sampled during this investigation (see Figure 4). A summary of monitoring well specifications and static water levels is shown on Table 1.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
18 MAR 1996	**N/A**	**-**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Second Groundwater Sampling Program, Natural Attenuation Demonstration Study, SWMU 66 Site, Keesler AFB, Mississippi	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Air Force Center for Enviromental Excellence, 3300 Signey Brooks, Brooks City-Base, TX 78235**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release, distribution unlimited

13. SUPPLEMENTARY NOTES
The original document contains color images.

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**UU**	**45**	

The depth to the water table, which varies seasonally and with rainfall events at this site, is relatively shallow. The average static water level measured on April 21, 1995, was 3.99 feet below ground surface (BGS). During the December 5, 1995, the average level was 5.35 ft BGS, or 1.36 ft lower than previously recorded.

The potentiometric surface contour map, based on water levels measured on December 5, 1995, indicate that groundwater within the upper water-bearing unit is generally moving in a northeasterly direction, at an average lateral flow gradient of 0.002 ft/ft (see Figure 3). However, the gradient along the western portion of the study area (i.e., near piezometer T-1) is steeper apparently due to the grassy area providing a source of recharge water.

As with the April 1995 investigation, no consistent upward or downward gradients have been observed over the SWMU 66 site. For example, on December 5, 1995, an upward gradient of 0.006 ft/ft was observed at the T-8/T-10 well cluster, no vertical gradient was observed at well cluster T-13/T-15, and a downward gradient of 0.05 ft/ft was noted in well cluster T-16/T-18 (see Figure 2 for cluster locations).

DISTRIBUTION OF CONTAMINANTS IN GROUNDWATER

A total of 20 groundwater test locations were sampled during December 1995 (see Figure 4). Details of sampling procedures and field activities are discussed in Appendix A; the laboratory testing program is shown on Table A.1. Summary results of groundwater laboratory analyses are shown on Figures 4 and 5, and detailed results are presented on Tables 2 through 5. A discussion of the findings is provided below.

Samples collected from monitoring wells and piezometer locations show an affected groundwater plume that extends approximately 175 ft in width by 245 ft in length and covers an area of approximately 21,800 sf (see Figure 5). During the investigation of the shallow water-bearing sand zone, no mobile non-aqueous phase liquid (NAPL) was detected in any sampling location. The highest concentration of BTEX compounds (benzene, 1.5 mg/L; ethylbenzene, 0.36 mg/L; toluene, 0.67 mg/L; and xylene, 2.8 mg/L) was reported in groundwater from piezometer T-13. However, the total BTEX concentration of 5.33 mg/L represents a decrease to nearly a third of the maximum concentration (i.e., 14.1 mg/L) reported from the same piezometer location during the April 1995 groundwater sampling program (see Table 7). As with the previous sampling event, BTEX concentrations decreased

significantly with depth. For example, at the three-well cluster location of T-13/T-14/T-15 BTEX concentration decreased from 5.33 mg/L at the 7.3 - 10. ft depth, to 0.039 mg/L at the 15 - 18 ft depth, to non-detect at the 22.6 to 25.6 ft depth. Trimethylbenzenes were detected in groundwater from 4 monitoring locations with the maximum concentration (0.96 mg/L of 1,2,4-trimethyl-benzene) recorded at piezometer T-13.

The maximum level of petroleum extractables measured in the groundwater samples was 2 mg/L at piezometer T-13. Total organic carbon levels measured in these wells ranged from 27 mg/L to 282 mg/L (see Table 2).

PAHs were detected in 8 of 13 well locations tested (see Table 3 and Figure 4). The only PAH detected, with one exception, was naphthalene which was measured at a maximum concentration of 0.235 mg/L in piezometer T-11. Trace levels of acenaphthene (i.e., 0.0002 mg/L and 0.0008 mg/L), the only other PAH constituent detected, were measured at sampling locations location T-16 and MW9-5R. Low levels of naphthalene (i.e., 0.0003 mg/L and 0.0009 mg/L) were detected in some outlying locations (i.e., wells MW9-5R and MW9-6) where no BTEX was measured in groundwater.

Laboratory results of groundwater testing for lead did not report concentrations greater than the analytical detection limit for this metal at any location (see Table 4). Significant depletion of electron acceptors (oxygen and sulfate) and generation of metabolic by-products (ferrous iron and methane) indicate active natural attenuation processes are occurring at this site. These data are presented on Tables 4 through 6, and details are discussed below.

The results of field testing of groundwater samples (i.e., temperature, pH, etc.) are provided on Table 6 for all piezometers and monitoring wells.

EVIDENCE OF NATURAL ATTENUATION

Electron Acceptor Consumption/By-Product Generation

Biodegradation of petroleum hydrocarbons is essentially an oxidation-reduction reaction where the hydrocarbon is oxidized and an electron acceptor is reduced. There are a number of different compounds that can act as electron acceptors including oxygen, nitrate, iron oxides (ferric iron), sulfate, and carbon dioxide. Ferrous iron and methane are by-products of anaerobic biodegradation. Theoretical reactions representing biodegradation mechanisms are discussed in the TS/CMS report.

As shown on Figure 6, geochemical data indicate intense aerobic and anaerobic biodegradation is occurring in the dissolved groundwater plume at the SWMU 66 site:

Supports Natural Attenuation?			Observed Pattern of Electron Acceptor/By-Products at the SWMU 66 Site
Y	N	I	
√			**Dissolved oxygen** concentrations fall from background levels of 2 mg/L outside of the plume area to approximately 0.6 mg/L inside the plume.
		√	**Nitrate** was not observed at any locations above the method detection limit (1 mg/L). These data neither support nor contradict on-going biodegradation processes at the site.
√			**Sulfate** depletion is observed within the plume area, non-detect levels (<1.6 mg/L), compared to background levels over 47 mg/L.
√			**Ferrous iron** concentrations of 24.15 mg/L were measured inside the plume, with background levels approximately 0.26 mg/L.
√			High concentrations of **methane** (up to 7.7 mg/L) were measured inside the plume area.

Note: Y = "Yes"; N = "No"; I = "Inconclusive"

As with most natural attenuation sites, areas with high total BTEX concentrations show depleted dissolved oxygen concentrations. Aerobic degradation plays an important role in subsurface attenuation at the SWMU 66 site.

Sulfate data show considerable depletion of this electron acceptor in the center of the plume, with background levels of 47 mg/L to 170 mg/L falling to <1.6 mg/L inside the plume. This decrease in sulfate concentration is a strong indication that anaerobic biodegradation of the BTEX compounds is occurring throughout the site.

The by-product data for ferrous iron and methane show strong correlations with the dissolved plume. The methane reading of 7.7 mg/L at well T-11 (compared to a background level of <0.12 mg/L), indicates that methanogens are active at this site. Measured ferrous iron concentrations of 24.15 mg/L at T-11 (see Table 4), indicate that ferric iron is being reduced to ferrous iron during biodegradation of BTEX compounds.

Based on the monitoring data, the groundwater contains significant biodegradation capacity, defined as the mass of contaminant which can be removed by one liter of groundwater moving from a clean background zone through the plume area. A biodegradation capacity of 16.7 mg/L, based on the amount of available electron acceptors measured during the April 1995 sampling event, was used in the BIOPLUME III model to apply the instantaneous reaction assumption for all potential biodegradation pathways, both aerobic and anaerobic (see the TS/CMS report for details). Using the recent (i.e., December 1995) sampling results, a biodegradation capacity of 15.4 mg/L was calculated, thereby confirming earlier conclusions.

Plume Characteristics

Available hydrogeologic data from the SWMU 66 site suggest that groundwater is migrating at a rate of 75 to over 100 feet per year. Based on this seepage velocity, the dissolved BTEX plume should have migrated to approximately 600 feet downgradient between 1989 (when gasoline leakage is assumed to have occurred) and 1995 (ignoring longitudinal dispersion, which would increase the length of the plume). Modeling details can be found in the TS/CMS. However, contaminant data collected during two sampling events in 1995 indicate that the plume extends only 160 ft to 260 ft downgradient of the source area. During the December sampling program the plume size and concentrations decreased significantly from the April sampling program, apparently due to seasonal water level variations. (Some of the variation in plume size may be due to different detection limits obtained during the two sampling events, see Section A.2.2 for discussion). The comparison between the expected plume length under a no-biodegradation scenario and the observed plume length indicate that natural biodegradation has removed dissolved BTEX components from the site.

SUMMARY

- In all cases but one, BTEX concentrations measured during the December sampling were lower than those recorded during April of 1995 (see Table 7). The decrease may be associated with the lower water levels recorded in December.

- The distribution of dissolved oxygen, sulfate, ferrous iron, and methane all confirm the occurrence of vigorous biodegradation

processes, both aerobic and anaerobic, at the SWMU 66 site (see Figure 6).

- As previously discussed in the TS/CMS report, the difference between the observed plume length and the expected plume length under a no-biodegradation scenario indicates that attenuation processes have had a significant effect on limiting plume migration at the SWMU 66 site. This conclusion is supported by existing plume dimensions obtained during the December 1995 sampling.

Should you have any questions regarding this report, please contact me or Ann Milliken at (713) 663-6600. We look forward to our further work together on this project.

Sincerely,

Robert N. Balcells, P.G.
Hydrogeologist

RNB:rb
Attachments

cc: Mr. John Chiaramonte, Jr.
Remedial Project Manager, Keesler AFB

GSI Job No. G-1584
Issued: 3/18/96

Second Groundwater Sampling Program

SWMU 66 Site, Keesler AFB, Mississippi
Air Force Center for Environmental Excellence (AFCEE)

FIGURES

Figure 1 Site Location Map

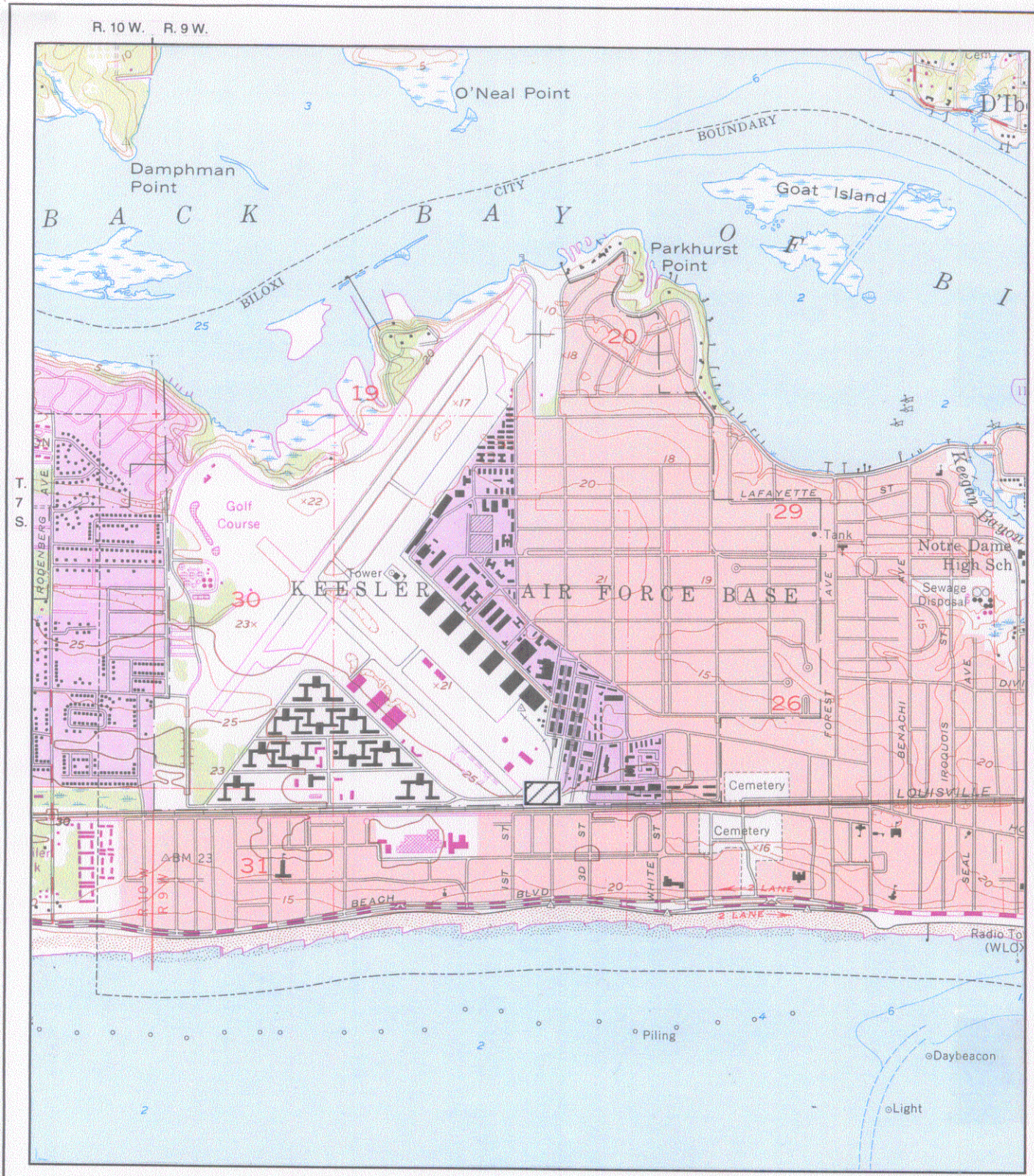
Figure 2 Groundwater Sampling Locations

Figure 3 Potentiometric Surface Contour Map for Shallow Coastal Sand Interval: 12/5/95

Figure 4 Results of Groundwater Testing: BTEX, PAH, TPH, and Lead

Figure 5 Concentration Isopleth Map: BTEX in Coastal Sand Groundwater

Figure 6 Distribution of Electron Acceptors and Metabolic By-Products Due to Natural Attenuation: December 1995



U.S. Geological Survey Map
Biloxi, Mississippi
Quadrangle: 7.5 minute
Map Date: 1954 (Photorevised 1976)

Location of SWMU 66 Site

SCALE (ft.)
0 1000 2000

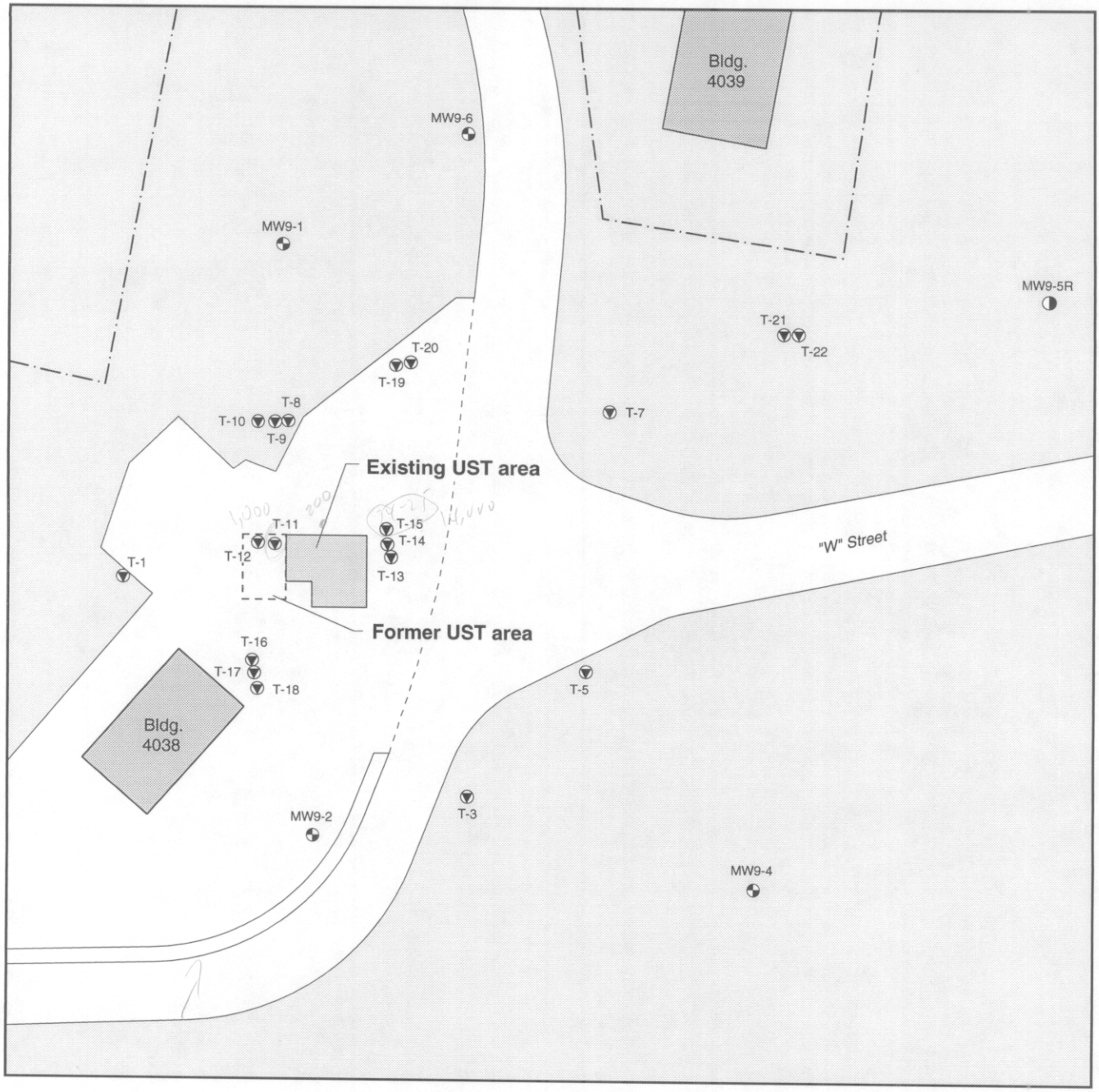
Groundwater Services, Inc.
Houston, Texas

SITE LOCATION MAP

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No.:	G-1584	Drawn By:	DLB
Date:	3/15/96	Approved By:	RNB
Revised:	———	Scale:	As Shown

FIGURE 1



LEGEND

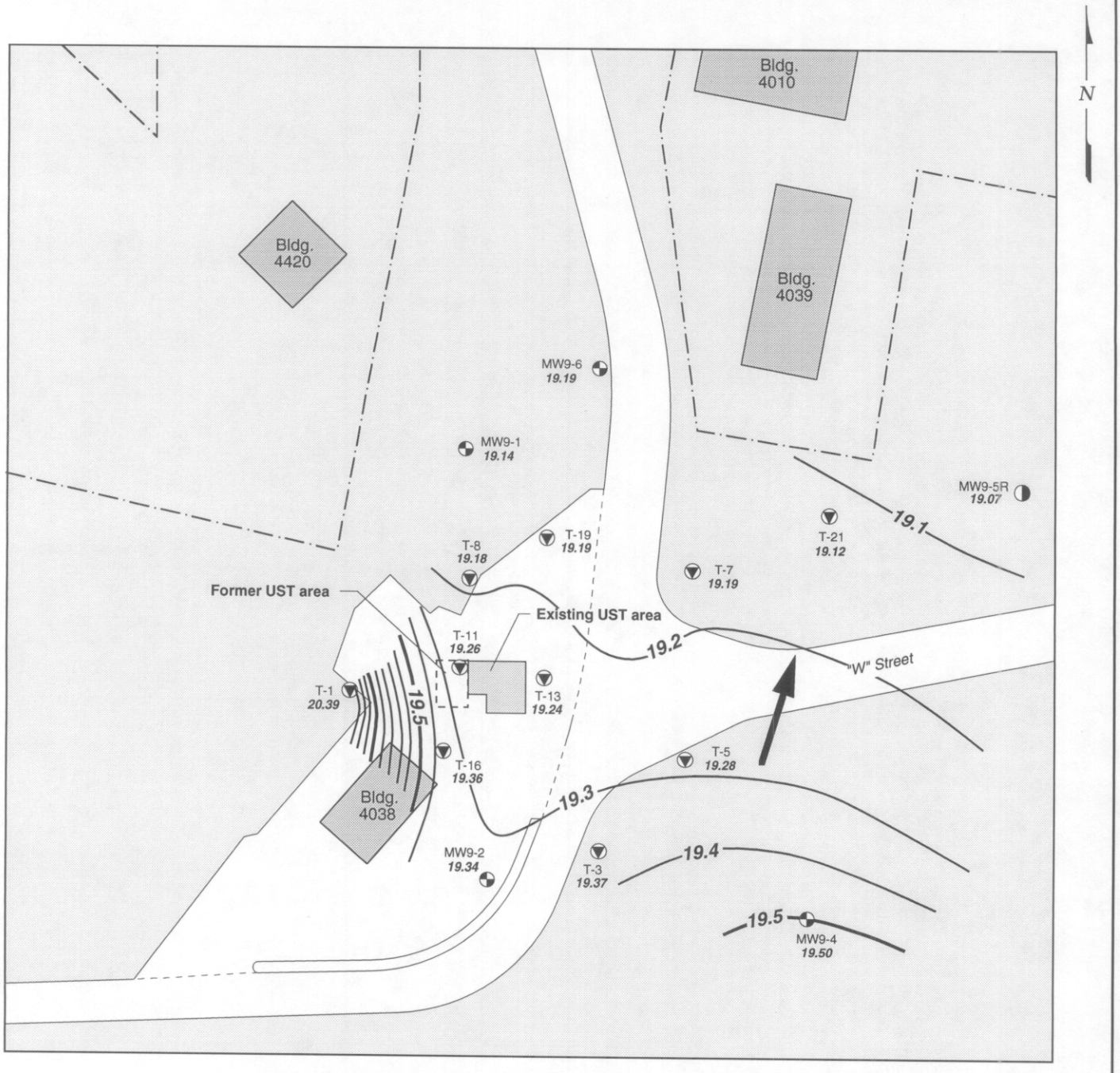
- Monitoring well location
- Temporary cone penetrometer (CPT) piezometer location
- Temporary hand auger piezometer location
- Fence

Groundwater Services, Inc.
Houston, Texas

GROUNDWATER SAMPLING LOCATIONS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No:	G-1584	Drawn By:	DLB
Issued:	3/15/96	Chk'd By:	RNB
Revised:	———	Appv'd By:	RNB
Scale:	As Shown	**FIGURE 2**	



LEGEND

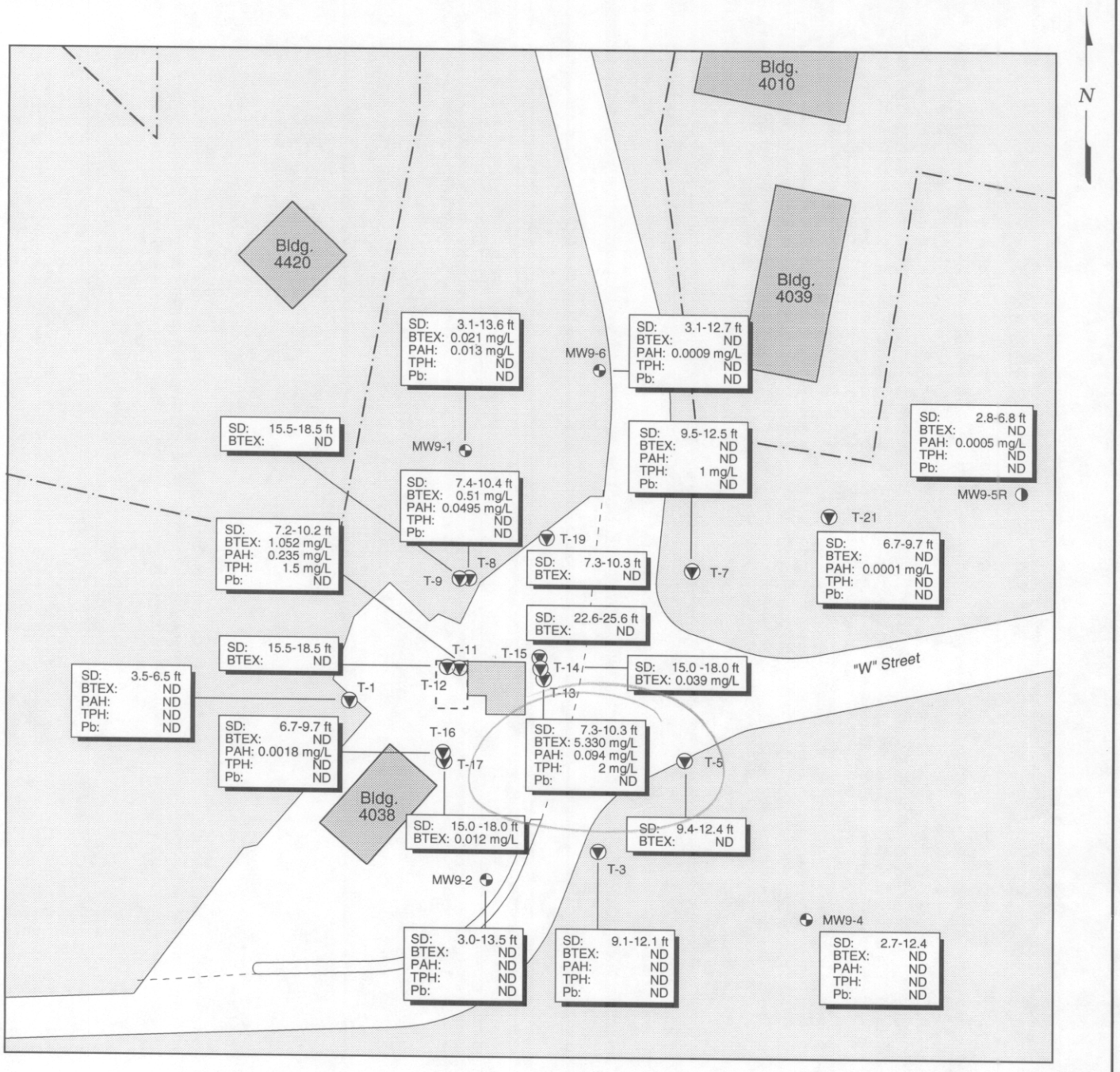
- Monitoring well location
- Temporary cone penetrometer (CPT) piezometer location
- Temporary hand auger piezometer location
- 20.83 Static water level elevation, ft mean sea level (12/5/95)
- —19.5— Potentiometric surface contour, ft mean sea level (12/5/95)
- Representative groundwater flow direction
- —·— Fence

Groundwater Services, Inc.
Houston, Texas

POTENTIOMETRIC SURFACE CONTOUR MAP FOR SHALLOW COASTAL SAND INTERVAL: 12/5/95

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No:	G-1584	Drawn By:	DLB
Issued:	3/15/96	Chk'd By:	JAS
Revised:	———	Appv'd By:	RNB
Scale:	As Shown	**FIGURE 3**	



LEGEND

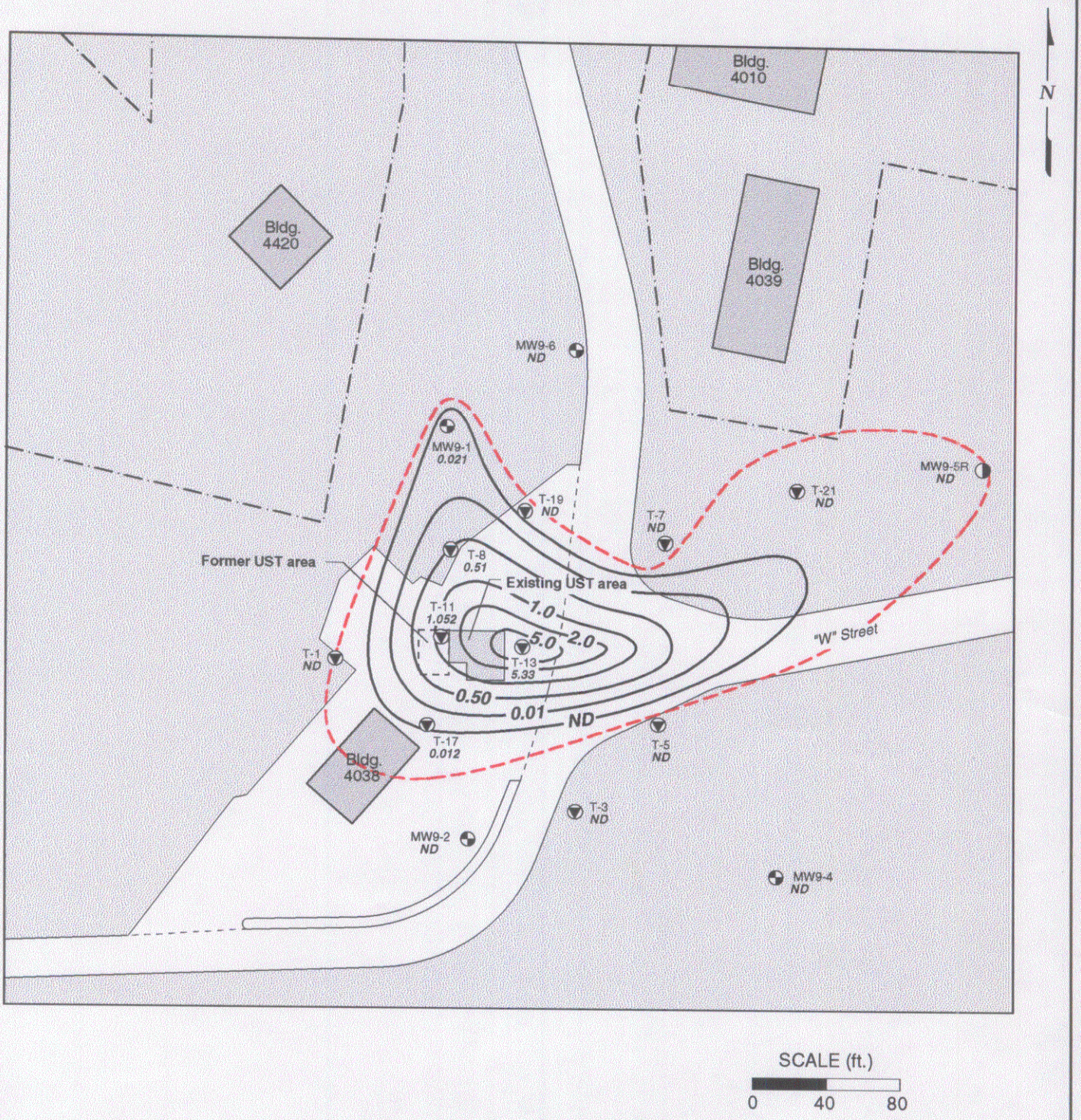
◔	Monitoring well location
▽	Temporary cone penetrometer (CPT) piezometer location
◑	Temporary hand auger piezometer location
SD	Screened depth
BTEX	Benzene, toluene, ethylbenzene, and xylenes
PAH	Polynuclear aromatic hydrocarbon
TPH	Petroleum extractables
Pb	Lead
ND	Not detected

Groundwater Services, Inc.
Houston, Texas

RESULTS OF GROUNDWATER TESTING: BTEX, PAH, TPH, AND LEAD

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No:	G-1584	Drawn By:	DLB
Issued:	3/15/96	Chk'd By:	RNB
Revised:	———	Appv'd By:	RNB
Scale:	As Shown	**FIGURE 4**	



LEGEND

◒	Monitoring well location
▼	Temporary cone penetrometer (CPT) piezometer location
◑	Temporary hand auger piezometer location
0.003	Total BTEX detected in groundwater sample, mg/L (12/95)
—*1.0*—	BTEX concentration isopleth, mg/L (12/95)
- - - -	Area of BTEX in groundwater (4/95)
BTEX	Benzene, toluene, ethylbenzene, and xylenes
ND	No BTEX detected at reported dection limit (i.e., 0.005 - 0.010 mg/L)
—·—	Fence

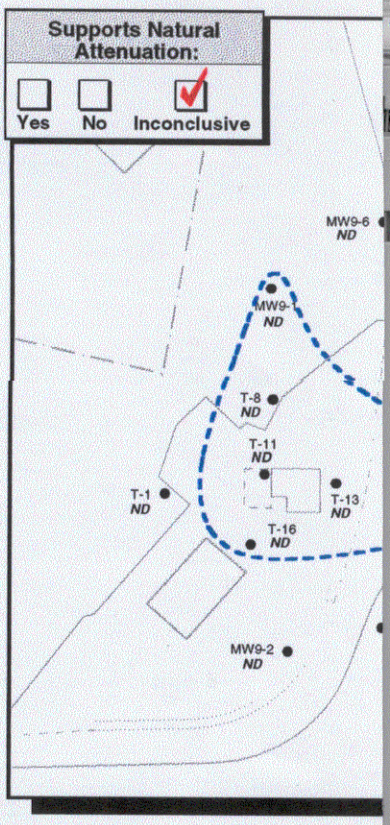
Groundwater Services, Inc.
Houston, Texas

CONCENTRATION ISOPLETH MAP: BTEX IN COASTAL SAND GROUNDWATER

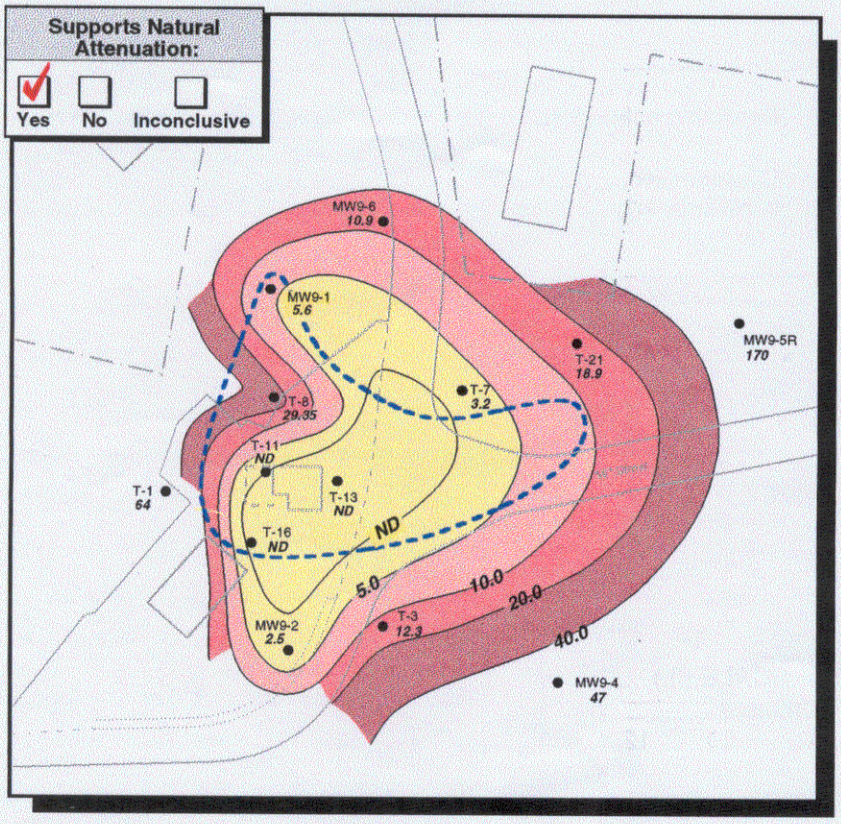
Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No:	G-1584	Drawn By:	DLB
Issued:	3/15/96	Chk'd By:	RNB
Revised:	———	Appv'd By:	RNB
Scale:	As Shown		FIGURE 5

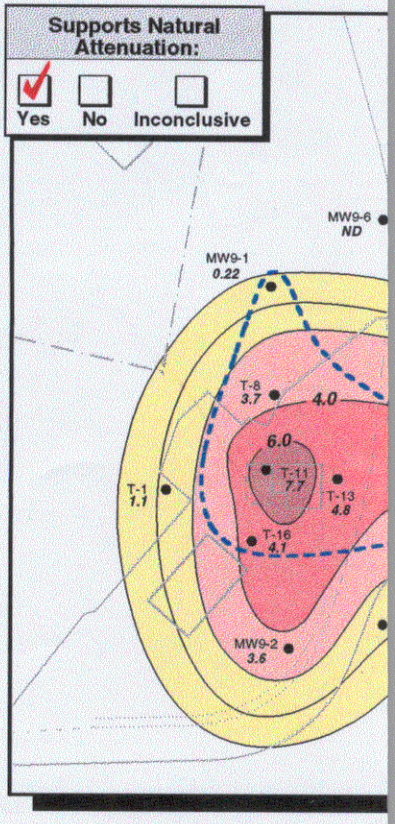
Dissolved Oxygen in Groundwater (mg/L)



Nitrate in Groundwater (mg



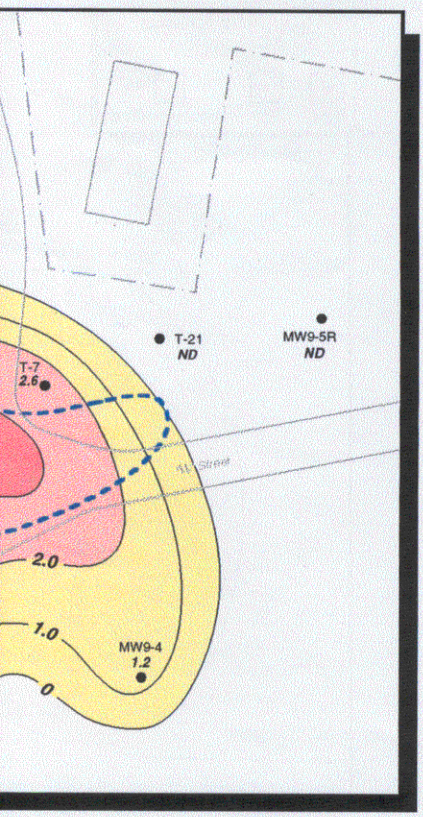
Sulfate in Groundwater (mg/L)



Methane in Groundwater (m

.)

Dissolved Ferrous Iron in Groundwater (mg/L)



/L)

LEGEND

- • Monitoring well location
- 3.2 Concentration of indicated constituent in groundwater
- Low ---------- High
- —5.0— Concentration contours of constituent in groundwater. Variable contour interval.
- ----- Area of BTEX-affected groundwater
- ND Not detected

NOTES: 1) Laboratory analysis results can be found on Tables 4 - 6.

2) A zero value represents less than detection limit for specific analytes.

SCALE (ft.)

0 60 120

Groundwater Services, Inc.
Houston, Texas

DISTRIBUTION OF ELECTRON ACCEPTORS AND METABOLIC BY-PRODUCTS DUE TO NATURAL ATTENUATION: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

GSI Job No:	G-1584	Drawn By:	DLB
Issued:	3/15/96	Chk'd By:	RNB
Revised:		Appv'd By:	RNB
Scale:	As Shown		**FIGURE 6**

GSI Job No. G-1584
Issued: 3/18/96

Second Groundwater Sampling Program

SWMU 66 Site, Keesler AFB, Mississippi
Air Force Center for Environmental Excellence (AFCEE)

APPENDICES

Appendix A: Sampling and Analysis Program

Appendix B: SPL Environmental Laboratory Reports

GSI Job No. G-1584
Issued: 3/18/96

APPENDIX A
SAMPLING AND ANALYSIS PROGRAM

Second Groundwater Sampling Program

SWMU 66 Site, Keesler AFB, Mississippi
Air Force Center for Environmental Excellence (AFCEE)

A.0 SAMPLING AND ANALYSIS PROGRAM

A.1 Sampling and Analytical Procedures

The sampling program and rationale, analytical procedures, and general QA/QC protocol followed during the simulation study field investigation were detailed in Appendix B of the Treatment Study/Test Design (TSTD) for the SWMU 66 site, Keesler AFB, dated January 13, 1995. The sampling and analytical procedures were designed to meet the objectives of the simulation of natural attenuation program, and were generally conducted in accordance with the AFCEE Protocol guidelines (Wiedemeier *et al.*, 1994). The following sections contain a summary of the sampling and analytical procedures followed at the SWMU 66 site during the December 1995 sampling program.

A.1.1 Monitoring Well MW9-5 Replacement

Monitoring well MW9-5 was found to be missing during the December 1995 sampling program. Apparently the well had been destroyed during construction activities in the area immediately adjacent to the well. For the purposes of the recent sampling event, a temporary piezometer was installed with a hand auger at the approximate location of well MW9-5. The piezometer was constructed of flush-threaded, 2-inch diameter, schedule 40 PVC casing, fitted with an approximate 5 ft length of No. 10 gauge slotted schedule 40 PVC wellscreen. Piezometer specifications can be found on Table 1.

The temporary piezometer was developed by bailing to remove fine-grained materials and ensure an effective hydraulic connection with the permeable sand units. Piezometer development proceeded until 1) the produced water was relatively free of fine particles, 2) at least ten piezometer casing volumes had been removed, and 3) at least three successive, stabilized readings of pH, specific conductivity, and temperature had been obtained (i.e., readings which were separated by the removal of at least one piezometer casing volume and which exhibited less than or equal to a 10 percent change in specific conductance, a 0.2 standard units change in pH, and a 1.0°F change in temperature).

For piezometer protection, a flush-grade cover was installed at ground surface. The temporary piezometer ground surface and top-of-casing elevation was determined by GSI to the nearest 0.01 foot relative to mean sea

level. The piezometer location was estimated to the nearest 1 foot relative to the Mississippi Coordinate System, East Zone, on the basis of nearby wells.

A.1.2 Groundwater Investigation

During this investigation, groundwater from 5 wells (including temporary piezometer MW9-5R) and 15 cone penetrometer piezometers were sampled and tested at the SWMU 66 site. Prior to sample collection, the wells and piezometers were purged to ensure collection of representative samples. Groundwater samples were collected from the monitoring wells and selected piezometers, analyzed for field parameters, and delivered under chain-of-custody control to SPL Environmental Laboratories (SPL). Collected samples were analyzed in the laboratory for the constituents indicated on Table A.1.

The site monitoring wells and piezometers were checked for the presence or absence of NAPLs using an interface probe which was lowered to the top of the water zone. All groundwater produced during development and sampling was placed in drums with sealed lids for handling by Keesler AFB personnel.

Sample Collection and Equipment Decontamination

General procedures for the handling and collection of groundwater samples are listed below:

1) A site-wide static water level survey was performed on December 5, 1995, prior to groundwater sampling. Static water levels were measured with a clean electronic water level indicator in all existing monitoring wells and most piezometers at the SWMU 66 site during the sampling episode. Results of the water level survey are shown on Table 1.

2) At each location where groundwater was sampled, a minimum of three casing volumes of groundwater were purged immediately prior to sample collection. Prior to purging, the static water level and the bottom of the well and piezometers were measured to the nearest 0.01 foot using a clean static water level indicator.

3) All sampling equipment that contacted the groundwater sample was thoroughly cleaned before use in accordance with the following protocol:

   - Clean with potable water and phosphate-free detergent;

- Rinse with distilled or deionized water;
- Clean with distilled or deionized water and phosphate-free detergent;
- Triple rinse with distilled or deionized water.

When pre-cleaned dedicated sampling equipment was used (e.g., dedicated bailers, tubing for peristaltic pumps, etc.), the cleaning protocol specified above was not used. Dedicated Teflon bailers were used for all groundwater sampling.

4) To the extent possible, well and piezometer locations were sampled in order of increasing groundwater constituent concentrations in order to minimize potential for cross-contamination.

5) Groundwater sampling equipment and containers were handled only with clean latex or neoprene gloves. Gloves were changed between sampling locations.

6) Groundwater was collected as needed to fill the appropriate laboratory sample containers for the groundwater sampling parameters listed on Table A.1.

7) Additional groundwater was collected for immediate analysis of temperature, pH, dissolved oxygen, oxidation-reduction potential, and specific conductivity at the well and piezometer locations.

Sample Preservation and Shipment

All samples selected for laboratory analysis were prepared for shipment as follows:

1) Sample jar, bottle, or vial was sealed securely.

2) Label showing sample number and sample source, sampler's initials, and the date and time of sample collection was attached on sample container.

3) All pertinent information was entered on the field data sheets, and chain of custody/laboratory request form. The chain-of-custody/laboratory request form accompanied the samples throughout all phases of shipment and handling.

4) Samples were transported in ice chests containing an adequate volume of ice to maintain samples at a temperature of 4°C until received by laboratory.

5) Samples were transported via overnight courier for delivery to the lab, within 24 hours of sample collection.

Analytical Testing Program

A summary of the analytical program for groundwater samples collected in the Natural Attenuation project is provided on Table A.1 of this report. Tables B.3 and B.4 of the TSTD provided the sample container and preservation requirements associated with each laboratory test. Detailed information on the laboratory quality control/quality assurance evaluation is included in Section A.2, below.

A.2 Laboratory Data Validation Summary

A.2.1 Project Data Quality Objectives

Groundwater samples collected during December 1995 from the SWMU 66 site were submitted to SPL Environmental Laboratories (SPL) for analysis. The results of these analyses are shown on Tables 2 through 5 of this report. These data were used to confirm the results obtained during the April 1995 sampling program conducted to assess the effectiveness of natural attenuation at the site, and to model contaminant fate and transport using the BIOPLUME III model.

To ensure that data generated from this project would be valid, defensible, and of known precision and accuracy, a Quality Assurance Project Plan (QAPP) was prepared as part of the TSTD Workplan for the SWMU 66 site at Keesler AFB. The QAPP set forth quality assurance (QA) and quality control (QC) procedures to be implemented during the sampling and analysis activities of this investigation. A data validation was conducted to verify that all QA/QC procedures were followed and that statistical control was maintained during the laboratory analysis of samples. QA objectives for accuracy, precision, completeness, representativeness, and comparability were considered during the data validation process. Data validation parameters and results are outlined below.

A.2.2 Data Validation Assessment Parameters and Results

The following QA/QC parameters were used to validate all analytical data submitted by SPL for groundwater samples collected at the SWMU 66 site. The criteria for assessing these parameters were based upon QA/QC requirements detailed in the *AFCEE Handbook for the Installation Restoration Program (IRP)*, in addition to method-specified requirements. The assessment parameters and results of this data validation are discussed below and are summarized on Table A.2 of this appendix.

Field Quality Control

Chain of custody records were reviewed to verify that the frequency requirements were met for trip blanks, sample duplicates, and equipment blanks. The following frequencies for these field control samples were specified in the QAPP:

QC Parameter	Analytes Tested	Frequency
Trip Blanks	BTEX Compounds	1 per cooler
Equipment Blanks	All COCs	1 per 10 groundwater samples*
Duplicates	All COCs	1 per 10 groundwater samples

**Only if non-dedicated sampling equipment used.*

The analytical results of field duplicates and blanks were reviewed to assess sampling precision and the potential for sample contamination, respectively.

Groundwater Analyses: Twenty-two groundwater samples were collected during three days of sampling (December 5 - 7, 1995). A total of 4 trip blanks (one per cooler) were submitted for analysis of volatile aromatic hydrocarbons by EPA Method 8020 and trimethylbenzenes by EPA Method 8000. These volatile organic analytes were below the detection limit of 0.001 mg/L in all of the trip blanks analyzed.

Dedicated equipment was used for the collection of all groundwater samples. Therefore, as noted above, no equipment blanks were required.

The frequency requirement for the collection of groundwater duplicates was met: twenty groundwater samples and two duplicates were submitted for

analysis. The following equation was used to compute the relative percent difference (RPD) between a duplicate set of analyses:

$$RPD = 100 \times \frac{|x_1 - x_2|}{\left(\frac{x_1 + x_2}{2}\right)}$$

where: RPD = relative percent deviation, in percent,
x_1 = the value for the first duplicate, and
x_2 = the value for the second duplicate.

For the December 1995 data set, the RPDs among duplicate water analyses for total BTEX, TPH, total PAH, lead, and inorganic parameters (chloride, sulfate, and nitrate) were computed. Results for the duplicate sets collected from T-8 and T-11 averaged 35, 33, 5.2, 0, and 5.3 percent, respectively, indicating acceptable sampling precision.

Chain-of-Custody Procedures

Records were reviewed to ensure that sample custody was properly documented with appropriate signatures. Proper storage of the samples during transit from field to lab was confirmed by the notation of sample integrity and temperature upon receipt by SPL. Field and laboratory sample identifications were checked to confirm reporting consistency. All chain of custody documentation complied with these validation criteria, with one minor exception. The trimethylbenzene (TMB) compounds were analyzed by EPA Method 8000 as documented in the laboratory report, rather than by Method 8020 requested in the chain-of-custody. Method 8000 is essentially the same method as EPA Method 8020 as far as the experimental procedures and conditions are concerned. However, TMB compounds are not in the regular analysis list of Method 8020, thus the laboratory had to use a different method code for reporting purposes (i.e., Method 8000).

Holding Time

The elapsed time between field sampling and laboratory analysis dates were compared to method-specified holding times. All groundwater analyses were completed by the laboratory within holding time limits except for three confirmation samples for BTEX analyses (i.e., S66-GW-T-13, S66-GW-T-14,

and S66-GW-MW9-1) that were beyond the holding time limit. However, the primary samples were completed within holding times.

Laboratory Calibration Procedures

EPA method 8020 for volatile organic compounds requires that the initial instrument calibration include at least five standards containing all analytes of interest, and that response factors for these standards fall within a standard deviation range of less than 20%. Run logs, raw data (including chromatograms and quantitation reports), and calibration summaries provided by SPL were reviewed to verify that all initial calibrations met these criteria. Laboratory verification of quantitation limits was confirmed when the most dilute calibration standard contained all analytes of interest at a concentration near the practical quantitation limit. The reported frequency of continuing calibrations was checked to ensure that at least one mid-concentration standard was run each day, or for every twenty samples, whichever was more frequent. These requirements for initial and continuing calibrations were met for all Methods 8020 and 8000 analyses conducted on groundwater samples collected at the SWMU 66 site.

Laboratory Quality Control

Laboratory Control Sample Frequency Requirements: Laboratory documentation was reviewed to confirm that, at a minimum, one method blank, one laboratory control sample (LCS), and one matrix spike/matrix spike duplicate set were tested for every twenty samples analyzed. These laboratory control sample frequency requirements, as well as the method specified requirements for surrogate analyses, were met.

Laboratory Control Sample Results: The results for method blank analyses were checked to identify potential sample contamination occurring in the laboratory. No target analytes were detected in any laboratory blanks analyzed as part of this program.

Analytical accuracy was assessed by comparing the recoveries of spiked compounds in the LCS and surrogate spikes to the control limits specified in the QAPP. These quality control criteria were met for all reported data included in this report except for 7 groundwater samples in which the surrogate recovery (i.e., coronene) was below the quality control limit (see Table A.2).

Matrix spike analyses were reviewed to identify matrix specific bias. As discussed in the *AFCEE Handbook for the Installation Restoration Program,* matrix specific bias is suspected when the percent recoveries for matrix spike and matrix spike duplicate analyses are outside of control limits while the LCS recoveries are within control limits. All the matrix spike and matrix spike duplicate percent recoveries were within the quality limits except for 1,2,4-trimethylbenzenes, for which the MS and MSD recoveries were outside the established control limit in one of the three MS/MSD analyses conducted on water samples from this site (see Table A.2). The percent recoveries for all batch LCSs were within control limits, however, indicating statistical control and the possibility of matrix induced bias for these analytes.

Analytical precision (a measure of the reproducibility of data) was assessed by comparing the relative percent difference between matrix spike duplicates to the control limits specified in the QAPP. These quality control criteria were met for all analyses performed with one exception: the MS/MSD relative percent difference (RPD) values for recoveries were outside QC limits for fluorene, anthracene and benzo(a)pyrene in one of the three MS/MSD analyses. The LCS control, however, indicated analytical accuracy was maintained during these analyses, which implicitly confirms acceptable precision.

Detection Limits for BTEX: The quantitation limits for BTEX analyses were above the required minimum detection limits due to dilution required in order to avoid sample foaming problem exhibited during analysis. The source of the foaming was not determined. However, a non-detect result of surfactant analysis conducted on affected samples suggested that surfactants are not the source of the problem.

Corrective Actions

No corrective actions were taken or required for either the field or laboratory program of this project. However, if additional groundwater sampling is conducted at this site, further investigations to determine reasons for foaming problems encountered will be beneficial to improve BTEX detection limits in future analyses.

A.2.3 Data Validation Summary

Completeness

The data validation procedures described above were conducted on all analytical data generated for and subsequently included in this treatability and corrective measures study. All analyses were performed within holding time limits, and the data quality objectives established for analytical accuracy and precision were consistently met. Therefore, the completeness of this data, defined as the percentage of measurements performed that are judged to be valid measurements, is essentially 100%.

Representativeness

Representativeness is a qualitative assessment of the degree to which environmental data truly represent the site characteristics or conditions being measured. Both field and laboratory blanks analyzed for this project indicate no sample contamination occurred during sampling or analysis. The relative percent difference between field duplicates indicate acceptable sampling precision. As stated above, essentially all analytical results are considered valid, and the distribution of sampling locations appears to encompass the contaminated zone at this site. Therefore, the reported data may be considered representative of actual site conditions.

Comparability

Comparability is a measure of the degree to which distinct data sets can be compared. The complete documentation of field sampling procedures provided with this report, the adherence by SPL to EPA method protocols, and the use of conventional metric units supports the comparability of this data with other data which has been or may in the future be collected at the site.

GSI Job No. G-1584
Issued: 3/18/96

Second Groundwater Sampling Program

SWMU 66 Site, Keesler AFB, Mississippi
Air Force Center for Environmental Excellence (AFCEE)

TABLES

Table A.1 Summary of Groundwater Laboratory Testing Program

Table A.2 Results of Laboratory Data Validation: Water Analyses

TABLE A.1
SUMMARY OF GROUNDWATER
LABORATORY TESTING PROGRAM

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

ANALYTE	METHOD NO.
Organics	
BTEX	EPA 8020
Trimethylbenzenes	EPA 8000
Petroleum Extractables (TPH)	EPA 418.1
Polynuclear Aromatic Hydrocarbons (PAH)	EPA 8310
Total Organic Carbon (TOC)	EPA 9060
Metals	
Lead	EPA 7421
Dissolved Iron	EPA 6010
Inorganics:	
Alkalinity	EPA 310.1
Nitrate	EPA 300.0
Chloride	EPA 300.0
Sulfate	EPA 300.0
Total Dissolved Solids	EPA 160.1
pH	EPA 150.1
Specific Conductance	EPA 120.1
Misc.	
Headspace Gas:	
- Methane, Ethane, and Ethene	RSKSOP 147
- Carbon Dioxide	RSKSOP 114

NOTE:
1) BTEX = Benzene, toluene, ethylbenzene, and xylenes.
2) EPA methods analyzed in accordance with "Test Methods for Evaluating Solid Waste, SW-846", third edition, "Methods for Chemical Analyses of Water and Wastes", second edition, EPA, June 1992.
3) RSKSOP = R.S. Kerr Laboratory Standard Operating Procedures.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate % Recoveries	LCS % Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
T-1/ S66-GW-T-1	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-3/ S66-GW-T-3	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-5/ S66-GW-T-5	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
T-7/ S66-GW-T-7	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.

See notes on page 6 of this table.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate Recoveries	LCS Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
T-8/ S66-GW-T-8	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 6	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-8 DUP/ S66-GW-T-8	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 6	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-9/ S66-GW-T-9	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
T-11/ S66-GW-T-11	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 6	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.

See notes on page 6 of this table.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample Location/ Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate Recoveries	LCS Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
T-11 DUP/ S66-GW-T-11	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 6	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-12/ S66-GW-T-12	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
T-13/ S66-GW-T-13	BTEX	8020	√	see note 2	see note 9	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	see note 7	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
T-14/ S66-GW-T-14	BTEX	8020	√	see note 2	see note 9	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
T-15/ S66-GW-T-15	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
T-16/ S66-GW-T-16	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 6	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.

See notes on page 6 of this table.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate Recoveries	LCS Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
T-17/	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
S66-GW-T-17	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
T-19/	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
S66-GW-T-19	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
T-21/	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
S66-GW-T-21	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
MW9-1/	BTEX	8020	√	see note 2	see note 9	√	√	see note 8	√	√	√	√	N.A.	N.A.	N.A.
S66-GW-MW9-1	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	see note 7	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
MW9-2/	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
S66-GW-MW9-2	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	see note 7	√	√	√
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.

See notes on page 6 of this table.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate Recoveries	LCS Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
MW9-4/ S66-GW-MW9-4	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
MW9-5R/ S66-GW-MW9-5	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
MW9-6/ S66-GW-MW9-6	BTEX	8020	√	see note 2	√	√	√	see note 8	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
	TPH	418.1	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	PAHs	8310	√	see note 2	√	√	√	√	√	√	see note 5	√	√	√	see note 3
	TOC	9060	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	Dissolved Lead	7421	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Dissolved Iron	6010	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Chloride	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Nitrate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Sulfate	300.0	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	TDS	160.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	√	√	√
	Alkalinity	310.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.
	pH	150.1	√	see note 2	√	N.A.	N.A.	N.A.	√	√	√	√	N.A.	N.A.	N.A.

See notes on page 6 of this table.

TABLE A.2
RESULTS OF LABORATORY DATA VALIDATION: WATER ANALYSES

Sampling Period: December 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

Sample ID	Analyte	EPA Method Number	Field QC Sample Frequency	Chain of Custody Control	Holding Time	Initial/Continuing Calibrations		Laboratory Verification of Quantitation Limits	Laboratory QC Sample Frequency	Laboratory QC Samples			MS/MSD Results		
						Frequency	Results			Blank Results	Surrogate Recoveries	LCS Recoveries	MS % Recoveries	MSD % Recoveries	MS/MSD RPD (%)
Trip Blank #1	BTEX	8020	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
Trip Blank #2	BTEX	8020	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
Trip Blank #3	BTEX	8020	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√
Trip Blank #4	BTEX	8020	√	see note 2	√	√	√	√	√	√	√	√	√	√	√
	TMB	8000	√	see note 2	√	√	√	√	√	√	√	√	see note 4	see note 4	√

Notes:

1. All samples analyzed by SPL Environmental Laboratories, Houston, Texas, in accordance with EPA method protocols. See Tables 2 through 4 for results of groundwater sample analyses. Four Trip Blanks were included in this analytical program; all tested analytes (TMB and Total Volatile Aromatic Hydrocarbons) were below the detection limits in all blank samples.
2. The inclusion of trip blanks prepared by the Laboratory was not documented on chain of custody forms for water samples. Results of trip blank analyses were, however, reported for these sample sets.
3. The relative percent difference (RPD) of MS and MSD recoveries were out of quality control limits for fluorene, anthracene, and benzo(a)pyrene. The batch LCS, however, was within limits.
4. MS and MSD recoveries were below quality control limits for 1,2,4-trimethylbenzene. The batch LCS, however, was within limits.
5. Surrogate (coronene) recovery was below quality control limit. The batch LCS, however, was within limits.
6. Surrogate recoveries for both surrogates (coronene and biphenyl) were diluted out. The batch LCS, however, was within limits.
7. LCS recovery for naphthalene was above quality control limit in this batch. All the other batch LCS's, however, were within QC limits.
8. Quantitation limits were above the required minimum detection limits due to dilution required in order to avoid the sample foaming problem exhibited during analysis.
9. Confirmation analyses for BTEX were performed outside of holding time limit. The regular analyses, however, were within the holding time limit.
10. √ = Parameter met quality control criteria specified in the QAPP for this project.

BTEX = Benzene, toluene, ethylbenzene, and xylenes.
DUP = Duplicate.
LCS = Laboratory control sample.
PAHs = Polynuclear aromatic hydrocarbons.
MS = Matrix spike.
MSD = Matrix spike duplicate.
N.A. = Not applicable.
TDS = Total dissolved solids.
TMB = Trimethylbenzenes.
TOC = Total organic carbon.
TPH = Petroleum extractable.

GSI Job No. G-1584
Issued: 3/18/96

Second Groundwater Sampling Program

SWMU 66 Site, Keesler AFB, Mississippi
Air Force Center for Environmental Excellence (AFCEE)

TABLES

Table 1	Static Water Level Data and Temporary Piezometer/Monitoring Well Specifications
Table 2	Results of Groundwater Testing: Volatile Organic Compounds, Petroleum Extractables, and TOC
Table 3	Results of Groundwater Testing: Polynuclear Aromatic Hydrocarbons
Table 4	Results of Groundwater Testing: Inorganic Compounds and Water Quality Parameters
Table 5	Results of Groundwater Testing: Headspace Methane, Ethane, Ethene, and Carbon Dioxide
Table 6	Results of Groundwater Testing: Field Analyses
Table 7	Change in BTEX Concentration from April to December 1995

TABLE 1
STATIC WATER LEVEL DATA
AND TEMPORARY PIEZOMETER/MONITORING WELL SPECIFICATIONS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

WELL NUMBER	DATE INSTALLED	TOTAL DEPTH (ft, BGS)	SCREENED DEPTH INTERVAL (ft, BGS)	MISSISSIPPI COORDINATE SYSTEM NORTH (ft)	MISSISSIPPI COORDINATE SYSTEM EAST (ft)	GROUND SURFACE ELEVATION (ft, MSL)	TOP OF CASING ELEVATION (ft, MSL)	STATIC WATER LEVEL ELEVATION 3/24/95 (ft, MSL)	STATIC WATER LEVEL ELEVATION 4/21/95 (ft, MSL)	STATIC WATER LEVEL ELEVATION 12/5/95 (ft, MSL)
T-1	3/21/95	6.75	3.51-6.51	266,332.19	473,843.46	24.49	24.30	21.90	21.27	20.39
T-3	3/21/95	12.31	9.07-12.07	266,249.63	473,979.35	25.34	25.26	20.73	20.98	19.37
T-5	3/21/95	12.59	9.35-12.35	266,296.17	474,020.62	24.81	24.53	20.80	21.04	19.28
T-7	3/21/95	12.71	9.47-12.47	266,396.90	474,029.44	24.45	24.28	20.70	20.72	19.19
T-8	3/21/95	10.65	7.41-10.41	266,391.93	473,909.71	24.61	24.16	20.41	20.70	19.18
T-9	3/21/95	18.69	15.45-18.45	266,391.74	473,907.33	24.64	24.35	20.66	20.84	19.21
T-10	3/21/95	25.76	22.52-25.52	266,391.61	473,904.24	24.62	24.44	20.71	20.61	19.27
T-11	3/21/95	10.48	7.24-10.24	266,344.26	473,904.56	24.79	24.50	19.51	20.76	19.26
T-12	3/21/95	18.72	15.48-18.48	266,345.31	473,900.99	24.89	24.61	19.87	20.79	19.27
T-13	3/21/95	10.57	7.33-10.33	266,342.48	473,949.48	24.79	24.40	20.15	20.76	19.24
T-14	3/22/95	18.24	15.0-18.0	266,344.99	473,947.94	24.70	24.44	19.34	20.77	19.26
T-15	3/21/95	25.81	22.57-25.57	266,347.85	473,947.40	24.67	24.39	20.80	20.77	19.24
T-16	3/22/95	9.96	6.72-9.72	266,297.71	473,897.02	24.87	24.60	18.90	19.86	19.36

Notes:

1) Temporary piezometers ("T" and MW9-5R locations) and monitoring well locations are shown on Figure 2. "T" piezometers were constructed of 1.5-inch inside diameter, schedule 40 PVC, flush-thread casing, fitted with 3-ft length No. 10 gauge, slotted, schedule 40 PVC wellscreen. Monitoring wells were constructed of 2-inch inside diameter, schedule 40 PVC, flush-thread casing, fitted with 10-ft length No. 10 gauge, slotted, schedule 40 PVC wellscreen. Hand auger temporary piezometer MW9-5R was constructed similar to the monitoring wells but with a 5-ft length of wellscreen.
2) Surface elevations and locations for piezometers and observation wells, except for MW9-5R, surveyed by Cassady & Assoc., Inc., on March 24, 1995. Piezometer MW9-5R surveyed by GSI on December 7, 1995. All elevations surveyed relative to mean sea level (MSL). Locations surveyed relative to Mississippi Coordinate System, east zone.
3) BGS = Below ground surface.
   * = Approximate location.

TABLE 1
STATIC WATER LEVEL DATA
AND TEMPORARY PIEZOMETER/MONITORING WELL SPECIFICATIONS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

WELL NUMBER	DATE INSTALLED	TOTAL DEPTH (ft, BGS)	SCREENED DEPTH INTERVAL (ft, BGS)	MISSISSIPPI COORDINATE SYSTEM NORTH (ft)	MISSISSIPPI COORDINATE SYSTEM EAST (ft)	GROUND SURFACE ELEVATION (ft, MSL)	TOP OF CASING ELEVATION (ft, MSL)	STATIC WATER LEVEL ELEVATION 3/24/95 (ft, MSL)	STATIC WATER LEVEL ELEVATION 4/21/95 (ft, MSL)	STATIC WATER LEVEL ELEVATION 12/5/95 (ft, MSL)
T-17	3/22/95	18.24	15.0-18.0	266,296.09	473,897.87	24.86	24.71	20.06	20.83	19.32
T-18	3/22/95	25.24	22.0-25.0	266,294.14	473,898.92	24.87	24.70	19.52	19.63	18.59
T-19	3/23/95	10.58	7.34-10.34	266,413.55	473,954.04	24.49	24.10	20.47	20.67	19.19
T-20	3/23/95	25.14	21.90-24.90	266,414.88	473,955.60	24.49	24.26	17.35	19.18	19.34
T-21	3/23/95	9.98	6.74-9.74	266,426.87	474,101.31	24.47	24.02	NM	20.65	19.12
T-22	3/23/95	25.07	21.83-24.83	266,426.83	474,103.54	24.41	24.12	17.49	20.64	19.15
MW9-1	10/27/89	13.80	3.1-13.6	266,459.34	473,907.56	24.44	24.20	20.30	20.65	19.14
MW9-2	10/27/89	13.50	3.0-13.5	266,234.30	473,920.26	24.65	24.44	20.66	20.86	19.34
MW-9-3	Destroyed	---	---	---	---	---	---	---	---	---
MW-9-4	4/18/95	15.00	2.72-12.40	266,215.35	474,087.93	25.37	25.03	---	21.09	19.50
MW-9-5	4/18/95	13.00	2.31-11.99	266,439.99	474,197.71	23.21	22.84	---	20.58	Destroyed
MW-9-5R	12/4/95	7.15	2.25-6.75	266,439*	474,197*	23.12	23.04	---	---	19.07
MW-9-6	4/18/95	15.00	3.06-12.74	266,501.94	473,977.13	24.11	24.14	---	20.63	19.19

Notes:

1) Temporary piezometers ("T" and MW9-5R locations) and monitoring well locations are shown on Figure 2. "T" piezometers were constructed of 1.5-inch inside diameter, schedule 40 PVC, flush-thread casing, fitted with 3-ft length No. 10 gauge, slotted, schedule 40 PVC wellscreen. Monitoring wells were constructed of 2-inch inside diameter, schedule 40 PVC, flush-thread casing, fitted with 10-ft length No. 10 gauge, slotted, schedule 40 PVC wellscreen. Hand auger temporary piezometer MW9-5R was constructed similar to the monitoring wells but with a 5-ft length of wellscreen.
2) Surface elevations and locations for piezometers and observation wells, except for MW9-5R, surveyed by Cassady & Assoc., Inc., on March 24, 1995. Piezometer MW9-5R surveyed by GSI on December 7, 1995. All elevations surveyed relative to mean sea level (MSL). Locations surveyed relative to Mississippi Coordinate System, east zone.
3) BGS = Below ground surface.
   * = Approximate location.

TABLE 2
RESULTS OF GROUNDWATER TESTING:
VOLATILE ORGANIC COMPOUNDS, PETROLEUM EXTRACTABLES, AND TOC

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-1	T-3	T-5	T-7	T-8	Duplicate T-8	T-9
SAMPLE IDENTIFICATION:	S66-GW-T-1	S66-GW-T-3	S66-GW-T-5	S66-GW-T-7	S66-GW-T-8	S66-GW-T-24	S66-GW-T-9
SAMPLING DATE:	12/5/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/14/95	12/14/95	12/14/95	12/14/95	12/20/95	12/14/95	12/9/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Benzene	<0.010	<0.010	<0.010	<0.010	**0.340**	**0.360**	<0.010
Toluene	<0.010	<0.010	<0.010	<0.010	<0.025	**0.005**	<0.010
Ethylbenzene	<0.010	<0.010	<0.010	<0.010	**0.055**	**0.076**	<0.010
Total Xylene	<0.010	<0.010	<0.010	<0.010	**0.084**	**0.099**	<0.010
TOTAL BTEX	ND	ND	ND	ND	**0.479**	**0.540**	ND
SAMPLING DATE:	12/5/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/14/95	12/14/95	12/14/95	12/14/95	12/14/95	12/20/95	12/14/95
1,2,3-Trimethylbenzene	<0.010	<0.010	<0.010	<0.010	<0.025	**0.013**	<0.010
1,2,4-Trimethylbenzene	<0.010	<0.010	<0.010	<0.010	<0.025	**0.032**	<0.010
1,3,5-Trimethylbenzene	<0.010	<0.010	<0.010	<0.010	<0.025	**0.009**	<0.010
SAMPLING DATE:	12/5/95	12/6/95		12/6/95	12/6/95	12/6/95	
ANALYSIS DATE:	12/18/95	12/14/95		12/18/95	12/14/95	12/14/95	
Petroleum Extractables	<1.0	<1.0	NA	1	<1.0	<1.0	NA
SAMPLING DATE:	12/5/95	12/6/95		12/6/95	12/6/95	12/6/95	
ANALYSIS DATE:	12/9/95	12/9/95		12/9/95	12/9/95	12/9/95	
TOC	**28**	**42**	NA	**43**	**65**	**67**	NA

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas. BTEX was analyzed in accordance with EPA Method 8020, trimethylbenzenes by Method 8000, Petroleum Extractables by Method 418.1, and TOC by Method 9060.
3. Four trip blanks (one for each cooler submitted) were analyzed for volatile aromatics and trimethylbenzenes. All test results were non-detect for these analytes.
4. BTEX = Benzene, toluene, ethylbenzene, and xylenes.
   TOC = Total organic carbon.
   < = Compound not detected above the specified detection limit.
   ND = Not detected.
   NA = Not analyzed for this compound.

TABLE 2
RESULTS OF GROUNDWATER TESTING:
VOLATILE ORGANIC COMPOUNDS, PETROLEUM EXTRACTABLES, AND TOC

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-11	Duplicate T-11	T-12	T-13	T-14	T-15	T-16	T-17
SAMPLE IDENTIFICATION:	S66-GW-T-11	S66-GW-T-33	S66-GW-T-12	S66-GW-T-13	S66-GW-T-14	S66-GW-T-15	S66-GW-T-16	S66-GW-T-17
SAMPLING DATE:	12/6/95	12/6/95	12/5/95	12/5/95	12/5/95	12/5/95	12/5/95	12/6/95
ANALYSIS DATE:	12/20/95	12/14/95	12/14/95	12/20/95	12/14/95	12/14/95	12/14/95	12/14/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Benzene	**0.590**	**0.400**	<0.010	**1.500**	**0.039**	<0.025	<0.010	**0.012**
Toluene	**0.230**	**0.073**	<0.010	**0.670**	<0.025	<0.025	<0.010	<0.010
Ethylbenzene	**0.150**	**0.120**	<0.010	**0.360**	<0.025	<0.025	<0.010	<0.010
Total Xylene	**0.390**	**0.150**	<0.010	**2.800**	<0.025	<0.025	<0.010	<0.010
TOTAL BTEX	**1.360**	**0.743**	ND	**5.330**	**0.039**	ND	ND	**0.012**
SAMPLING DATE:	12/6/95	12/6/95	12/5/95	12/5/95	12/5/95	12/5/95	12/5/95	12/6/95
ANALYSIS DATE:	12/14/95	12/13/95	12/14/95	12/20/95	12/14/95	12/14/95	12/14/95	12/14/95
1,2,3-Trimethylbenzene	**0.040**	<0.050	<0.010	**0.231**	<0.025	<0.025	<0.010	<0.010
1,2,4-Trimethylbenzene	**0.072**	<0.050	<0.010	**0.960**	<0.025	<0.025	<0.010	**0.029**
1,3,5-Trimethylbenzene	<0.010	<0.050	<0.010	<0.025	<0.025	<0.025	<0.010	<0.010
SAMPLING DATE:	12/6/95	12/6/95		12/5/95			12/6/95	
ANALYSIS DATE:	12/14/95	12/14/95		12/14/95			12/18/95	
Petroleum Extractables	**2**	**1**	NA	**2**	NA	NA	<1.0	NA
SAMPLING DATE:	12/6/95	12/6/95		12/5/95			12/5/95	
ANALYSIS DATE:	12/9/95	12/9/95		12/9/95			12/9/95	
TOC	**160**	**158**	NA	**64**	NA	NA	**282**	NA

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas. BTEX was analyzed in accordance with EPA Method 8020, trimethylbenzenes by Method 8000, Petroleum Extractables by Method 418.1, and TOC by Method 9060.
3. Four trip blanks (one for each cooler submitted) were analyzed for volatile aromatics and trimethylbenzenes. All test results were non-detect for these analytes.
4. BTEX = Benzene, toluene, ethylbenzene, and xylenes.
   TOC = Total organic carbon.
   < = Compound not detected above the specified detection limit.
   ND = Not detected.
   NA = Not analyzed for this compound.

TABLE 2
RESULTS OF GROUNDWATER TESTING:
VOLATILE ORGANIC COMPOUNDS, PETROLEUM EXTRACTABLES, AND TOC

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-19	T-21	MW9-1	MW9-2	MW9-4	MW9-5R	MW9-6
SAMPLE IDENTIFICATION:	S66-GW-T-19	S66-GW-T-21	S66-GW-MW9-1	S66-GW-MW9-2	S66-GW-MW9-4	S66-GW-MW9-5	S66-GW-MW9-6
SAMPLING DATE:	12/6/95	12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/9/95	12/14/95	12/20/95	12/14/95	12/14/95	12/14/95	12/14/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Benzene	<0.001	<0.010	**0.021**	<0.010	<0.010	<0.005	<0.005
Toluene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
Ethylbenzene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
Total Xylene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
TOTAL BTEX	ND	ND	**0.021**	ND	ND	ND	ND
SAMPLING DATE:	12/6/95	12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/9/95	12/14/95	12/14/95	12/14/95	12/14/95	12/14/95	12/14/95
1,2,3-Trimethylbenzene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
1,2,4-Trimethylbenzene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
1,3,5-Trimethylbenzene	<0.001	<0.010	<0.010	<0.010	<0.010	<0.005	<0.005
SAMPLING DATE:		12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:		12/14/95	12/14/95	12/14/95	12/18/95	12/18/95	12/14/95
Petroleum Extractables	NA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
SAMPLING DATE:		12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:		12/9/95	12/9/95	12/9/95	12/9/95	12/9/95	12/9/95
TOC	NA	**48**	**38**	**103**	**29**	**34**	**27**

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas. BTEX was analyzed in accordance with EPA Method 8020, trimethylbenzenes by Method 8000, Petroleum Extractables by Method 418.1, and TOC by Method 9060.
3. Four trip blanks (one for each cooler submitted) were analyzed for volatile aromatics and trimethylbenzenes. All test results were non-detect for these analytes.
4. BTEX = Benzene, toluene, ethylbenzene, and xylenes.
   TOC = Total organic carbon.
   < = Compound not detected above the specified detection limit.
   ND = Not detected.
   NA = Not analyzed for this compound.

TABLE 3
RESULTS OF GROUNDWATER TESTING:
POLYNUCLEAR AROMATIC HYDROCARBONS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-1	T-3	T-7	T-8	Duplicate T-8	T-11	Duplicate T-11	T-13
SAMPLE IDENTIFICATION:	S66-GW-T-1	S66-GW-T-3	S66-GW-T-7	S66-GW-T-8	S66-GW-T-24	S66-GW-T-11	S66-GW-T-33	S66-GW-T-13
SAMPLING DATE:	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/5/95
ANALYSIS DATE:	12/18/95	12/18/95	12/18/95	12/18/95	12/21/95	12/18/95	12/18/95	12/12/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Naphthalene	<0.00012	<0.0006	<0.00012	**0.051**	**0.048**	**0.23**	**0.24**	**0.094**
Acenaphthylene	<0.00005	<0.00025	<0.00005	<0.00025	<0.00025	<0.025	<0.025	<0.005
Acenaphthene	<0.00006	<0.0003	<0.00006	<0.0003	<0.0003	<0.03	<0.03	<0.006
Fluorene	<0.0002	<0.001	<0.0002	<0.001	<0.001	<0.1	<0.1	<0.02
Phenanthrene	<0.00007	<0.0003	<0.00007	<0.00035	<0.00035	<0.035	<0.035	<0.007
Anthracene	<0.00008	<0.0004	<0.00008	<0.0004	<0.0004	<0.04	<0.04	<0.008
Fluoranthene	<0.0002	<0.001	<0.0002	<0.001	<0.001	<0.1	<0.1	<0.02
Pyrene	<0.00006	<0.0003	<0.00006	<0.0003	<0.0003	<0.03	<0.03	<0.006
Chrysene	<0.00006	<0.0003	<0.00006	<0.0003	<0.0003	<0.03	<0.03	<0.006
Benzo(a)anthracene	<0.00005	<0.00025	<0.00005	<0.00025	<0.00025	<0.025	<0.025	<0.005
Benzo(b)fluoranthene	<0.00006	<0.0003	<0.00006	<0.0003	<0.0003	<0.03	<0.03	<0.006
Benzo(k)fluoranthene	<0.00004	<0.0002	<0.00004	<0.0002	<0.0002	<0.02	<0.02	<0.004
Benzo(a)pyrene	<0.0002	<0.001	<0.0002	<0.001	<0.001	<0.1	<0.1	<0.02
Dibenzo(a,h)anthracene	<0.00004	<0.0002	<0.00004	<0.0002	<0.0002	<0.02	<0.02	<0.004
Benzo(g,h,i)perylene	<0.00006	<0.0003	<0.00006	<0.0003	<0.0003	<0.03	<0.03	<0.006
Indeno(1,2,3-cd)pyrene	<0.00008	<0.0004	<0.00008	<0.0004	<0.0004	<0.04	<0.04	<0.008
TOTAL	ND	ND	ND	**0.051**	**0.048**	**0.23**	**0.24**	**0.094**

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas, in accordance with EPA Method 8310.
3. < = Compound not detected above the specified detection limit
   ND = Not detected.
   NA = Not analyzed.

TABLE 3
RESULTS OF GROUNDWATER TESTING:
POLYNUCLEAR AROMATIC HYDROCARBONS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-16	T-21	MW9-1	MW9-2	MW9-4	MW9-5R	MW9-6
SAMPLE IDENTIFICATION:	S66-GW-T-16	S66-GW-T-21	S66-GW-MW9-1	S66-GW-MW9-2	S66-GW-MW9-4	S66-GW-MW9-5	S66-GW-MW9-6
SAMPLING DATE:	12/7/95	12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/18/95	12/18/95	12/14/95	12/17/95	12/18/95	12/18/95	12/18/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Naphthalene	**0.001**	**0.0001**	**0.013**	<0.0006	<0.00012	**0.0003**	**0.0009**
Acenaphthylene	<0.00025	<0.00005	<0.005	<0.00025	<0.00005	<0.00005	<0.00005
Acenaphthene	**0.0008**	<0.00006	<0.006	<0.0003	<0.00006	**0.0002**	<0.00006
Fluorene	<0.001	<0.0002	<0.02	<0.001	<0.0002	<0.0002	<0.0002
Phenanthrene	<0.00035	<0.00007	<0.007	<0.00035	<0.00007	<0.00007	<0.00007
Anthracene	<0.0004	<0.00008	<0.008	<0.0004	<0.00008	<0.00008	<0.00008
Fluoranthene	<0.001	<0.0002	<0.02	<0.001	<0.0002	<0.0002	<0.0002
Pyrene	<0.0003	<0.00006	<0.006	<0.0003	<0.00006	<0.00006	<0.00006
Chrysene	<0.0003	<0.00006	<0.006	<0.0003	<0.00006	<0.00006	<0.00006
Benzo(a)anthracene	<0.00025	<0.00005	<0.005	<0.00025	<0.00005	<0.00005	<0.00005
Benzo(b)fluoranthene	<0.0003	<0.00006	<0.006	<0.0003	<0.00006	<0.00006	<0.00006
Benzo(k)fluoranthene	<0.00023	<0.00004	<0.004	<0.0002	<0.00004	<0.00004	<0.00004
Benzo(a)pyrene	<0.001	<0.0002	<0.02	<0.001	<0.0002	<0.0002	<0.0002
Dibenzo(a,h)anthracene	<0.0002	<0.00004	<0.004	<0.0002	<0.00004	<0.00004	<0.00004
Benzo(g,h,i)perylene	<0.0003	<0.00006	<0.006	<0.0003	<0.00006	<0.00006	<0.00006
Indeno(1,2,3-cd)pyrene	<0.0004	<0.00008	<0.008	<0.0004	<0.00008	<0.00008	<0.00008
TOTAL	**0.0018**	**0.0001**	**0.013**	ND	ND	**0.0005**	**0.0009**

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas, in accordance with EPA Method 8310.
3. < = Compound not detected above the specified detection limit
   ND = Not detected.
   NA = Not analyzed.

TABLE 4
RESULTS OF GROUNDWATER TESTING:
INORGANIC COMPOUNDS AND WATER QUALITY PARAMETERS

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-1	T-3	T-7	T-8	Duplicate T-8	T-11	Duplicate T-11	T-13
SAMPLE IDENTIFICATION:	S66-GW-T-1	S66-GW-T-3	S66-GW-T-7	S66-GW-T-8	S66-GW-T-24	S66-GW-T-11	S66-GW-T-33	S66-GW-T-13
SAMPLING DATE:	12/6-7/1995	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/5/95
ANALYSIS DATE:	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95
ANALYTE								
Iron, dissolved (mg/L)	0.74	2.53	1.70	4.40	4.24	23.9	24.4	3.46
Lead, dissolved (mg/L)	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chloride (mg/L)	15.3	5.7	17.4	15.7	17.0	11.7	10.9	15.0
Nitrate, as NO_3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sulfate (mg/L)	64	12.3	3.2	26.9	31.8	<1.6	<1.6	<1.6
Total Dissolved Solids (mg/L)	512	468	124	436	416	668	660	304
Specific Conductance (µmhos/cm)	775	667	160	536	548	670	738	307
Alkalinity, as $CaCO_3$ (mg/L)	335	353	30	232	230	335	366	114
pH	6.83	6.61	5.39	6.59	6.34	6.44	6.43	6.03

SAMPLE LOCATION:	T-16	T-21	MW9-1	MW9-2	MW9-4	MW9-5R	MW9-6
SAMPLE IDENTIFICATION:	S66-GW-T-16	S66-GW-T-21	S66-GW-MW9-1	S66-GW-MW9-2	S66-GW-MW9-4	S66-GW-MW9-5	S66-GW-MW9-6
SAMPLING DATE:	12/6-7/1995	12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95	12/7-18/95
ANALYTE							
Iron, dissolved (mg/L)	12.5	0.24	0.99	3.14	0.27	1.62	1.2
Lead, dissolved (mg/L)	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Chloride (mg/L)	22.0	4.7	18.0	8.8	10.0	13.7	8.0
Nitrate, as NO_3 (mg/L)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Sulfate (mg/L)	<1.6	18.9	5.6	2.5	47	170	10.9
Total Dissolved Solids (mg/L)	1100	168	268	420	606	384	196
Specific Conductance (µmhos/cm)	1320	203	352	332	942	512	279
Alkalinity, as $CaCO_3$ (mg/L)	668	70	138	142	456	24	120
pH	6.58	5.91	6.33	6.04	6.65	5.46	6.33

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas; iron was analyzed in accordance with EPA Method 6010; lead by method 7421; chloride, nitrate and sulfate by Method 300; total dissolved solids by Method 160.1; specific conductance by Method 120.1; alkalinity by Method 310.1; and pH by Method 150.1.
3. < = Compound not detected above the specified detection limit.

TABLE 5
RESULTS OF GROUNDWATER TESTING:
HEADSPACE METHANE, ETHANE, ETHENE, AND CARBON DIOXIDE

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-1	T-3	T-7	T-8	Duplicate T-8	T-11	Duplicate T-11	T-13
SAMPLE IDENTIFICATION:	S66-GW-T-1	S66-GW-T-3	S66-GW-T-7	S66-GW-T-8	S66-GW-T-24	S66-GW-T-11	S66-GW-T-33	S66-GW-T-13
SAMPLING DATE:	12/5/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/6/95	12/5/95
ANALYSIS DATE:	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Methane	1.1	1.2	2.6	3.5	3.9	7.5	7.9	4.8
Ethene (Ethylene)	<0.32	<0.32	<1.92	<1.92	<1.92	<3.84	<3.84	<1.92
Ethane	<0.25	<0.25	<1.5	<1.5	<1.5	<3.00	<3.00	<1.5
Carbon Dioxide (ppm)	65	64	82	71	78	140	82	58

SAMPLE LOCATION:	T-16	T-21	MW9-1	MW9-2	MW9-4	MW9-5R	MW9-6
SAMPLE IDENTIFICATION:	MW-16	S66-GW-T-21	S66-GW-MW9-1	S66-GW-MW9-2	S66-GW-MW9-4	S66-GW-MW9-5	S66-GW-MW9-6
SAMPLING DATE:	12/5/95	12/6/95	12/5/95	12/5/95	12/6/95	12/6/95	12/6/95
ANALYSIS DATE:	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95	12/18-20/95
COMPOUND	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Methane	4.1	<0.12	0.22	3.6	1.2	<0.12	<0.12
Ethene (Ethylene)	<1.92	<0.32	<0.32	<1.92	<1.92	<0.32	<0.32
Ethane	<1.5	<0.25	<0.25	<1.5	<1.5	<0.25	<0.25
Carbon Dioxide (ppm)	87	52	41	86	71	71	33

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. All analyses performed by SPL Environmental Laboratories, Houston, Texas, in accordance with R.S. Kerr Environmental Research Laboratory Standard Operating Procedures RSKSOP 114 (carbon dioxide) and RSKSOP 147 (methane, ethene, and ethane).
3. < = Compound not detected above the specified detection limit.

TABLE 6
RESULTS OF GROUNDWATER TESTING:
FIELD ANALYSES

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

SAMPLE LOCATION:	T-1	T-3	T-7	T-8	T-9	T-11	T-12	T-13	T-14	T-15
TESTING DATE:	12/5-7/95	12/6-7/95	12/6-7/95	12/6-7/95	12/6-7/95	12/6-7/95	12/5-7/95	12/5-7/95	12/5-7/95	12/5-7/95
Temperature (°F)	68.2	71.8	73.8	70.7	73.9	71.4	75.4	73.6	72.1	73.9
Dissolved Oxygen (ppm)	2.00	1.40	0.85	1.25	0.85	0.60	1.20	1.20	1.00	NM
Specific Conductance (µmhos/cm)	786	671	227	586	232	829	303	315	350	118
pH	6.72	6.51	5.49	6.29	6.15	6.48	6.17	6.07	6.56	5.35
Redox (mV)	-123.1	-201.2	-171.6	-158.3	-206.8	2.0	-200.1	-175.7	11.1	-181.0

SAMPLE LOCATION:	T-16	T-17	T-19	T-21	MW9-1	MW9-2	MW9-4	MW9-5R	MW9-6
TESTING DATE:	12/5-7/95	12/6-7/95	12/6-7/95	12/6-7/95	12/5-7/95	12/5-7/95	12/6-7/95	12/6-7/95	12/6-7/95
Temperature (°F)	73.2	73.6	72.1	71.2	74.1	72.5	70.5	70.0	72.7
Dissolved Oxygen (ppm)	2.80	1.50	0.70	1.40	0.80	1.20	0.80	1.20	1.20
Specific Conductance (µmhos/cm)	1419	337	350	215	375	362	923	511	288
pH	6.73	6.07	5.48	5.91	6.49	6.14	6.85	5.33	6.33
Redox (mV)	-22.8	-189.1	-138.8	118.9	-157.6	-209.9	-200.1	-185.5	135.5

NOTES:

1. Groundwater samples collected at locations shown on Figure 2.
2. Oxidation-reduction potential (redox) readings taken with an Orion portable pH/Ise Meter. Dissolved oxygen levels were measured downhole using a YSI Model 51B Oxygen Meter. Temperature, pH, and specific conductance readings were taken using a Hydac Meter.

TABLE 7
CHANGE IN BTEX
CONCENTRATION FROM APRIL TO DECEMBER 1995

Second Groundwater Sampling Program
SWMU 66 Site, Keesler AFB, Mississippi

WELL NUMBER	SCREENED DEPTH INTERVAL (ft BGS)	BTEX CONCENTRATION April 1995 (mg/L)	BTEX CONCENTRATION Dec. 1995 (mg/L)	CHANGE IN BTEX CONCENTRATION Increase	Decrease	None
T-1	3.51-6.51	ND	ND	---	---	√
T-3	9.07-12.07	ND	ND	---	---	√
T-5	9.35-12.35	ND	ND	---	---	√
T-7	9.47-12.47	ND	ND	---	---	√
T-8	7.41-10.41	0.793	0.510	---	36%	---
T-9	15.45-18.45	ND	ND	---	---	√
T-11	7.24-10.24	1.180	1.052	---	11%	---
T-12	15.48-18.48	0.001	ND	---	---	√
T-13	7.33-10.33	14.100	5.330	---	62%	---
T-14	15.0-18.0	1.550	0.039	---	97%	---
T-15	22.57-25.57	0.020	ND	---	38%	---
T-16	6.72-9.72	0.596	ND	---	99%	---
T-17	15.0-18.0	0.157	0.012	---	92%	---
T-19	7.34-10.34	0.016	ND	---	97%	---
T-21	6.74-9.74	0.210	ND	---	98%	---
MW9-1	3.1-13.6	0.003	0.021	600%	---	---
MW9-2	3.0-13.5	ND	ND	---	---	√
MW-9-4	2.72-12.40	ND	ND	---	---	√
MW-9-5*	2.31-11.99	0.001	ND	---	---	√
MW-9-6	3.06-12.74	ND	ND	---	---	√

Notes:

1) For the purpose of calculations, a 0.001 mg/L detect value was considered a non-detect (ND).
2) For calculating percentage of decrease where a non-detect value is involved, half the detection limit was used.
3) BGS = Below ground surface.

* = Reported December 1995 value is for MW9-5R, the MW9-5 replacement location.